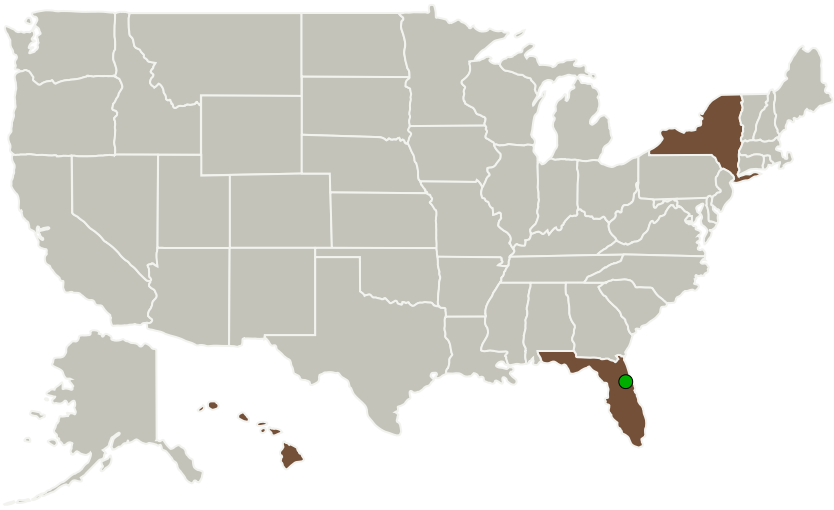
Planetary LEGO, Phase I

Completed Technology Project (2017 - 2018)

Project Introduction

Prior to human arrival to the Moon or Mars, a certain amount of infrastructure will be required in order to ensure success of the overall goals of the mission. Such infrastructure will include some type of landing pads. In order to reduce the volume/mass of construction materials to be transported from Earth, it will be critical to utilize in-situ resources as the main construction material. Regolith seems to be the most logical choice given its abundance and easy access. The proposed technology would allow for the robotic construction of critical structures in-situ using native resources. In Phase I we therefore propose to: Determine the ideal shapes for the building blocks that will allow mechanical jointing and construction of horizontal (landing pads, roads, etc.) and vertical (habitat, shelter, etc.) structures. Manufacture the molds to fabricate these building blocks. Fine tune the sintering process (thermal profile) to ensure repeatability of the fabrication of the material. Produce prototype building blocks and test their structural properties and strength of the joints. Develop the robotic concept for making the horizontal and vertical structures. Design a horizontal and a vertical structure for fabrication during Phase II.

Primary U.S. Work Locations and Key Partners



Planetary LEGO, Phase I Briefing Chart Image

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Organizations Performing Work	Role	Type	Location
Honeybee Robotics, Ltd.	Lead Organization	Industry	Pasadena, California
Kennedy Space Center(KSC)	Supporting Organization	NASA Center	Kennedy Space Center, Florida
Pacific International Space Center for Exploration Systems(PISCES)	Supporting Organization	US Government	Hilo, Hawaii

Primary U.S. Work Locations	
Florida	Hawaii
New York	

Images

Briefing Chart Image
Planetary LEGO, Phase I Briefing Chart Image
(https://techport.nasa.gov/image/135010)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Honeybee Robotics, Ltd.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

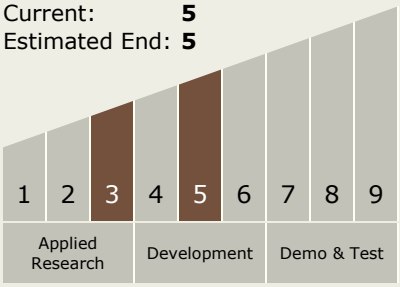
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Rodrigo Romo

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX07 Exploration Destination Systems
  - TX07.2 Mission Infrastructure, Sustainability, and Supportability
    - TX07.2.3 Surface Construction and Assembly

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System